WHAT IS CLAIMED IS:

1. A coating composition comprising an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment; and

a binder.

2. The composition of claim 1 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

3. A coating composition comprising an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment; and

a neutral to slightly acidic generating extender or an acidic generating extender.

4. A coating composition comprising an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment; and

an amino acid.

5. A coating composition comprising an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment; and

at least one rare earth compound.

6. A coating composition comprising an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment;

at least one neutral to slightly acidic generating extender or acidic generating extender; and

at least one rare earth compound.

7. A coating composition comprising:

a binder;

one or more corrosion-inhibiting carbon pigments; and

one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders.

8. The coating composition of claim 7 wherein at least one of the one or more corrosion-inhibiting carbon pigments is a surface-modified corrosion-inhibiting carbon pigment.

9. The coating composition of claim 8 wherein the surface-modified corrosion-inhibiting carbon pigment is an inorganic dispersed carbon black.

10. The coating composition of claim 8 wherein the surface-modified corrosion-inhibiting carbon pigment is a resin-dispersed carbon black or a surfactant-dispersed carbon black.

11. The coating composition of 7 wherein at least one of the one or more corrosion-inhibiting carbon pigments is a conductive carbon pigment or a non-conductive carbon pigment.

12. The coating composition of claim 7 wherein at least one of the one or more corrosion-inhibiting carbon pigments is selected from the group consisting of acetylene black, channel black, furnace black, lamp black, thermal black, bone black and combinations thereof.

13. The coating composition of claim 7 wherein at least one of the one or more corrosion-inhibiting carbon pigments is an elemental form of carbon.

14. The coating composition of claim 7 wherein at least one of the one or more corrosion-inhibiting carbon pigments is an amorphous form of carbon.

15. The coating composition of claim 7 wherein at least one of the one or more corrosion-inhibiting carbon pigments is a carbon-containing mixture.

16. The coating composition of claim 7 wherein the carbon pigments are added in a weight percent range of about 0.1 to about 100%.

17. The coating composition of claim 7 wherein the coating composition has a pigment volume concentration of between about 5 to about 55.

18. The coating composition of claim 7 wherein the binder is an organic binder or inorganic binder.

19. The coating composition of claim 7 wherein the binder is an epoxy-based resin binder.

20. The coating composition of any of claim 19 wherein the epoxy-based resin binder is an amine-cured epoxy-based resin binder.

21. The coating composition of claim 20 wherein the epoxy-based resin binder is a water reducible epoxy-polyamide system.

22. The coating composition of claim 7 wherein the binder is a non epoxy-based resin binder.

23. The coating composition of claim 22 wherein the non epoxy-based resin binder is selected from the group consisting of urethanes, ureas, acrylates, alkyds, melamines, polyesters, vinyls, vinyl esters, silicones, siloxanes, silicates, sulfides, sulfones, epoxy novilacs, epoxy phenolics, drying oils, hydrocarbon polymers, and combinations thereof.

24. The coating composition of claim 7 wherein at least one of the one or more neutral to slightly acidic generating extenders or acidic generating extender is a sulfur, phosphorous or silicon oxyanion-containing compound.

25. The coating composition of claim 24 wherein the sulfur, phosphorous or silicon oxyanion-containing compound is selected from the group consisting of a metal cation sulfate, a metal cation sulfite, a metal cation sulfonate, a metal cation protonated phosphate, a cation phosphate, a metal cation phosphonite, an oxyphosphate, a clay mineral kaolin and combinations thereof.

26. The coating composition of claim 7 wherein at least one of the one or more neutral to slightly acidic generating extenders or one or more acidic generating extender is protonated calcium phosphate.

27. The coating composition of claim 7 wherein the one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders are added in a weight percent of between about 45% to about 75%.

28. The coating composition of claim 7 further comprising one or more corrosion co-inhibitors.

29. The coating composition of claim 28 wherein at least one of the one or more co-inhibitors is a rare earth compound.

30. A coating composition comprising:

a binder;

a surface-modified corrosion-inhibiting carbon pigment; and

one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders.

31. The coating composition of claim 30 wherein the surface-modified corrosion-inhibiting carbon pigment is an inorganic dispersed carbon black.

32. The coating composition of claim 30 wherein the surface-modified

corrosion-inhibiting carbon pigment is a resin-dispersed carbon black or a surfactant-dispersed carbon black.

33. The coating composition of claim 30 wherein at least one of the one or more neutral to slightly acidic generating extenders or acidic generating extender is an sulfur, phosphorous or silicon oxyanion salt selected from the group consisting of a metal cation sulfate, a metal cation sulfite, a metal cation sulfonate, a metal cation protonated phosphate, a cation phosphate, a metal cation phosphonite, an oxyphosphate, a clay mineral kaolin and combinations thereof.

34. The coating composition of claim 30 wherein the one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders are added in a weight percent of between about 45% to about 75%.

35. The coating composition of claim 30 wherein the binder is an amine-cured epoxy-based resin binder.

36. The coating composition of claim 30 further comprising one or more co-inhibitors.

37. The coating composition of claim 36 wherein at least one of the one or more co-inhibitors is a rare earth compound.

38. A coating composition comprising:

a binder;

a corrosion-inhibiting carbon pigment;

one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders; and

one or more co-inhibitors, wherein at least one of the one or more co-inhibitors is a rare earth compound.

39. The coating composition of claim 38 wherein the rare earth compound is a salt of a rare earth-containing compound, a hydroxide of a rare earth-containing compound, an oxide of a rare earth-containing compound or combinations thereof.

40. The coating composition of claim 38 wherein the rare earth compound is selected from the group consisting of cerium oxide, cerium hydroxide, cerium solid solution mixed oxide, cerium oxide mixture, cerium salt, neodymium oxide, neodymium hydroxide, neodymium solid solution mixed oxide, neodymium oxide mixture, neodymium salt, praseodymium oxide, praseodymium hydroxide, praseodymium solid solution mixed oxide, praseodymium oxide mixture, praseodymium salt, ytterbium oxide, ytterbium hydroxide, ytterbium solid solution mixed oxide, ytterbium oxide mixture, ytterbium salt, yttrium oxide, yttrium hydroxide, yttrium solid solution mixed oxide, yttrium oxide mixture, yttrium salt, terbium oxide, terbium hydroxide, terbium solid solution mixed oxide, terbium oxide mixture, terbium salt, and combinations thereof.

41. The coating composition of claim 38 wherein the rare earth compound is a praseodymium compound selected from the group consisting of a praseodymium mixed oxide, a praseodymium(III) oxide, a praseodymium(III) hydroxide, a praseodymium(IV) oxide, and combinations thereof.

42. The coating composition of claim 38 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

43. The coating composition of claim 42 wherein the surface-modified corrosion-inhibiting carbon pigment is an inorganic dispersed carbon black.

44. The coating composition of claim 42 wherein the surface-modified corrosion-inhibiting carbon pigment is a resin-dispersed carbon black or a surfactant-dispersed carbon black.

45. The coating composition of claim 38 wherein at least one of the one or more neutral to slightly acidic generating extenders or acidic generating extender is a sulfur, phosphorous or silicon oxyanion salt selected from the group consisting of a metal cation sulfate, a metal cation sulfite, a metal cation sulfonate, a metal cation protonated phosphate, a cation phosphate, a metal cation phosphonite, an oxyphosphate, a clay mineral kaolin and combinations thereof.

46. The coating composition of claim 38 wherein the one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders are added in a weight percent of between about 45% to about 75%.

47. The coating composition of claim 38 wherein the binder is an amine-cured epoxy resin.

48. The coating composition of claim 34 comprising at least two co-inhibitors.

49. A coating composition comprising:

a binder;

a corrosion-inhibiting carbon pigment; and

one or more co-inhibitors, wherein at least one of the one or more co-inhibitors is a rare earth compound.

50. The coating composition of claim 49 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

51. The coating composition of claim 50 wherein the surface-modified corrosion-inhibiting carbon pigment is surface-modified carbon black.

52. The coating composition of claim 49 wherein the rare earth compound is a praseodymium compound selected from the group consisting of a praseodymium mixed oxide, praseodymium(III) oxide, a praseodymium(III) hydroxide, and a

praseodymium(IV) oxide.

53. The coating composition of claim 49 further comprising one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders.

54. The coating composition of claim 54 wherein at least one of the one or more neutral to slightly acidic generating extenders or acidic generating extender is a sulfur, phosphorous or silicon oxyanion salt selected from the group consisting of a metal cation sulfate, a metal cation sulfite, a metal cation sulfonate, a metal cation protonated phosphate, a cation phosphate, a metal cation phosphonite, an oxyphosphate, a clay mineral kaolin and combinations thereof.

55. The coating composition of claim 44 wherein the binder is an amine-cured epoxy resin.

56. The coating composition of claim 49 comprising at least two co-inhibitors.

57. A coating composition comprising:
a binder;
a corrosion-inhibiting carbon pigment; and
an extender.

58. The coating composition of claim 57 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

59. The coating composition of claim 58 wherein the surface-modified corrosion-inhibiting carbon pigment is a surface-modified carbon black.

60. The coating composition of claim 57 wherein the binder is an amine-cured epoxy resin.

61. The coating composition of claim 57 further comprising one or more co-inhibitors.

62. The coating composition of claim 57 wherein at least one of the one or more co-inhibitors is a rare earth compound.

63. A coating system comprising:

a coating containing an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment applied to a substrate.

64. The coating system of claim 63 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting pigment.

65. The coating system of claim 63 further comprising a topcoat and one or more pretreatment coatings applied to the substrate to form a pretreated substrate.

66. The coating system of claim 65 wherein the topcoat is a urethane topcoat.

67. The coating system of claim 63 wherein the coating system is a resin system.

68. The coating system of claim 63 wherein the coating system is selected from the group consisting of a UV-coating system, electrolytic coating system, appliqué, powder coating system and microwave coating system.

69. The coating system of claim 65 wherein the substrate is coated by a method selected from the group consisting of spraying, brushing, rolling and dipping.

70. The coating system of claim 63 wherein the substrate is a composite substrate.

71. The coating system of claim 63 wherein the substrate is selected from the

group consisting of aluminum, aluminum alloys, steel, galvanized steel, zinc, zinc alloys, magnesium, and magnesium alloys.

72. A coating system comprising:

one or more pretreatment coatings applied to a substrate to form a pretreated substrate; and

a coating containing an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment further comprising a neutral to slightly acidic generating extender or acidic generating extender, the coating applied to the pretreated substrate.

73. The coating system of claim 72 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

74. The coating system of claim 72 further including a topcoat.

75. The coating system of claim 74 wherein the topcoat is a urethane topcoat.

76. The coating system of claim 72 wherein the coating system is a resin system.

77. The coating system of claim 72 wherein the coating system is selected from the group consisting of a UV-coating system, electrolytic coating system, appliqué, powder coating system and microwave coating system.

78. The coating system of claim 72 wherein the pretreated substrate is coated by a method selected from the group consisting of spraying, brushing, rolling and dipping.

79. The coating system of claim 72 wherein the pretreated substrate is a composite substrate.

80. The coating system of claim 72 wherein the substrate is selected from the group consisting of aluminum, aluminum alloys, steel, galvanized steel, zinc, zinc alloys, magnesium, and magnesium alloys.

81. A coating system comprising:

one or more pretreatment coatings applied to a substrate to form a pretreated substrate; and

a coating containing an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment further comprising at least one rare earth compound, the coating applied to the pretreated substrate.

82. The coating system of claim 81 wherein the corrosion-inhibiting carbon pigment is a surface-modified carbon pigment.

83. The coating system of claim 81 further including a topcoat.

84. The coating system of claim 81 wherein the coating system is a resin system.

85. The coating system of claim 81 wherein the coating system is selected from the group consisting of a UV-coating system, electrolytic coating system, appliqué, powder coating system and microwave coating system.

86. The coating system of claim 81 wherein the pretreated substrate is coated by a method selected from the group consisting of spraying, brushing, rolling and dipping.

87. A coating system comprising:

one or more pretreatment coatings applied to a substrate to form a pretreated substrate; and

a coating containing an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment further comprising a material selected from the group

consisting of an extender, one or more rare earth compounds, one or more additives and combinations thereof, the coating applied to the pretreated substrate.

88. The coating system of claim 87 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

89. The coating system of claim 87 further including a topcoat.

89. The coating system of claim 87 wherein the coating system is a resin system.

90. The coating system of claim 86 wherein the coating system is selected from the group consisting of a UV-coating system, electrolytic coating system, appliqué, powder coating system and microwave coating system.

91. The coating system of claim 86 wherein the pretreated substrate is coated by a method selected from the group consisting of spraying, brushing, rolling and dipping.

92. A method of preparing a coating composition comprising:
preparing a paint formulation; and
adding an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment to the paint formulation to produce a coating composition.

93. The method of claim 92 further comprising pre-dispersing the corrosion-inhibiting carbon pigment with a dispersant.

94. The method of claim 92 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

95. The method of claim 92 further comprising adding to the paint formulation a material selected from the group consisting of an acidic extender, a neutral extender,

one or more rare earth compounds, one or more additives and combinations thereof.

96. A method comprising:

providing a substrate to be coated; and

coating the substrate with a coating composition having an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment.

97. The method of claim 96 further comprising pre-dispersing the corrosion-inhibiting carbon pigment with a dispersant.

98. The method of claim 96 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

99. The method of claim 96 wherein the coating composition further contains a material selected from the group consisting of an extender, one or more rare earth compounds, one or more additives and combinations thereof.

100. The method of claim 96 wherein the substrate is a pretreated substrate.

101. The method of claim 100 wherein the pretreated substrate is coated by a method selected from the group consisting of spraying, brushing, rolling and dipping.

101. The method of claim 96 wherein the substrate is a composite substrate.

103. The method of claim 100 further comprising applying a topcoat.

104. The method of claim 103 wherein the topcoat is a urethane topcoat.

105. A method of preparing a coating composition comprising:

preparing a paint formulation; and

adding an effective corrosion-inhibiting amount of a corrosion-inhibiting carbon pigment to the paint formulation to produce a coating composition.

106. The method of claim 105 further comprising pre-dispersing the corrosion-inhibiting carbon pigment with a dispersant.

107. The method of claim 105 wherein the corrosion-inhibiting carbon pigment is a surface-modified corrosion-inhibiting carbon pigment.

108. The method of claim 105 wherein the coating composition further contains a material selected from the group consisting of an acidic extender, a neutral extender, one or more rare earth compounds, one or more additives and combinations thereof.

109. The method of claim 105 wherein the substrate is a pretreated substrate.

110. The method of claim 105 wherein the pretreated substrate is coated by a method selected from the group consisting of spraying, brushing, rolling and dipping.

111. The method of claim 105 further comprising applying a topcoat.

112. The coating composition of claim 7 wherein at least one of the one or more corrosion-inhibiting carbon pigments is crystalline carbon.

113. The coating composition of claim 7 wherein the carbon pigments are added in a weight percent range of about 3 to about 25%.

114. The coating composition of claim 7 wherein at least one of the one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders is a sulfur, phosphorous or silicon oxyanion-containing salt.

115. The coating composition of claim 7 wherein at least one of the one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders is a sulfate.

116. The coating composition of claim 115 wherein the sulfate is a metal sulfate.

117. The coating composition of claim 116 wherein the metal sulfate is selected from the group consisting of calcium sulfate, strontium sulfate, magnesium sulfate, barium sulfate and combinations thereof.

118. The coating composition of claim 7 wherein at least one of the one or more neutral to slightly acidic generating extenders or one or more acidic generating extenders is a phosphate.

119. The coating composition of claim 29 wherein the rare earth compound is a praseodymium(III) sulfate or a praseodymium(III/IV) oxide.

120. The coating composition of claim 57 wherein the extender is substantially soluble.

121. The coating system of claim 87 wherein the extender is a neutral to slightly acidic generating extender or an acidic generating extender.

122. The method of claim 99 wherein the extender is a neutral to slightly acidic generating extender or an acidic generating extender.